इंटरनेट मानक

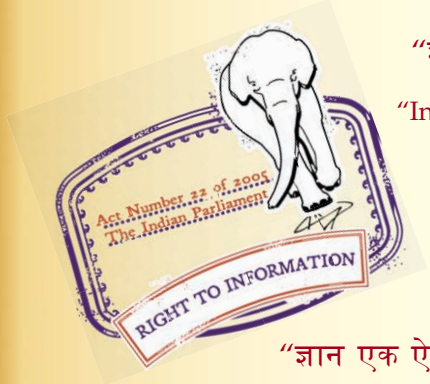
Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 12718 (1989): Leather for Garments - Performance Requirements [CHD 17: Leather, Tanning Materials and Allied Products]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

IS 12718 : 1989
(Reaffirmed 2002)

Indian Standard

LEATHER FOR GARMENTS — PERFORMANCE REQUIREMENTS

UDC 675·152

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1990

Price Group 6

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 31 March 1989, after the draft finalized by the Leather Sectional Committee had been approved by the Chemical Division Council.

Leather has been a high fashion garment material for centuries and fashion designers have used grain and suede leathers as an attractive clothing material for many design themes. Leather used for garments has to meet stringent requirements of the consumer for certain characteristics, such as, colour fastness, dimensional stability and cold crack resistance which are unique to apparatus only.

This standard has been formulated to help the leather industry which is faced with the problem of producing leather for new increasing markets with no defined standards of performance. It is hoped that this standard would greatly help boost the export of garment leathers.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

LEATHER FOR GARMENTS — PERFORMANCE REQUIREMENTS

1 SCOPE

1.1 This standard prescribes the requirements for leathers to be used in the manufacture of garments. It is applicable to suede leather, grain leather and wool sheep skins but excludes furs.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
IS 1640 : 1960	Glossary of terms relating to hides, skins and leather
IS 5868 : 1983	Methods of sampling for leather (*first revision*)
IS 5914 : 1970	Methods of physical testing of leather
IS 6191 : 1971	Methods of micro-biological colour fastness and microscopical tests for leather

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1640 : 1960 and the following shall apply.

3.1.1 *Cold Crack Temperature*

The highest temperature at which the finish of a leather will crack when the leather is folded quickly once, grain outwards.

4 REQUIREMENTS

4.1 Leathers shall meet the requirements given in Tables 1 and 2 as appropriate, when tested by the methods specified. For wool sheep skins, both surfaces shall comply with the requirements.

NOTE — Table 1 is applicable to all leathers, Table 2 gives additional requirements for grain leather.

4.2 Water Repellency

The leather shall not show any sign of stain or spot when tested according to the method prescribed in Annex F.

Table 1 Performance Requirements for All Garment Leathers

(*Clause* 4.1)

Sl No.	Characteristic	Requirement	Method of Test		
			Ref to Cl No. of		Ref to Annex
			IS 5914 : 1970	IS 6191 : 1971	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Tear strength, N	13 - 17	LP : 7	—	—
ii)	Dimensional stability* to dry cleaning, percent, *Max*:		—	—	A
	a) Maximum area shrinkage	6			
	b) Maximum area extension	3			
iii)	Colour fastness to light, contrast grading, maximum change in shade	3	—	LP : 4	—
iv)	Colour fastness to dry cleaning, contrast grading, maximum change in shade	3	—	—	B
v)	Colour fastness to rubbing, contrast grading:		—	LF : 9	—
	a) after 50 cycles of wet rubbing, maximum change in shade	3			
	b) after 200 cycles of dry rubbing, maximum change in shade	3			
vi)	Colour fastness to perspiration, contrast grading:		—	LF : 7	—
	a) Maximum change in shade	3			
	b) Maximum staining	3			
vii)	Colour fastness to water, contrast grading:		—	—	C
	a) Maximum change in shade	3			
	b) Maximum staining	3			

*The dimensional changes allowed do not imply that garments in wear will have this tolerance after dry cleaning. Experiments have shown that leathers giving this degree of area change in the test when processed as garments by normal commercial procedures with re-oiling can be restored to their original dimensions.

Table 2 Additional Performance Requirements for Grain Garment Leathers

(*Clause* 4.1)

Sl No.	Characteristic	Requirement	Method of Test, Ref to Annex
(1)	(2)	(3)	(4)
i)	Fastness of finish to dry cleaning*	No significant change in appearance	B
ii)	Adhesion of finish to leather, N/10 mm, *Min*:		D
	a) Dry condition	2	
	b) Wet condition	1	
iii)	Cold crack temperature, °C, *Max*	— 5	E

*This requirement has been included to ensure that grain leathers which are in accordance with colour fastness to dry cleaning requirement specified in Table 1 do not comply with the standard if the dry cleaning procedure results in partial or complete loss of finish.

5 MARKING

5.1 The leather shall be legibly marked on the flesh side of each piece with the area in square decimetres.

NOTE — The marking should not cause any disfiguration to the leather or migrate itself to the grain surface of the leather coming in contact with it.

6 PACKING

6.1 The leather shall be packed as agreed to between the purchaser and the supplier.

6.2 The package shall be marked with the name of the manufacturer and recognized trade-mark, if any; number of pieces of leather; total area; month and year of manufacture.

7 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 The scale of sampling and criteria for conformity of the material shall be as prescribed in IS 5868 : 1983.

ANNEX A

[*Table* 1, *Item* (ii)]

DIMENSIONAL STABILITY TO DRY CLEANING

A-1 SCOPE

A-1.1 This annex specifies a procedure for determination of dimensional stability of leather to dry cleaning in tetrachloroethylene. The method is intended only for the assessment of dimensional changes undergone by a specimen subjected to a single dry cleaning and finishing operation; when it is desired to determine the amount of progressive dimensional change, the method may be repeated for a specified number of cycles normally not exceeding five.

A-2 PRINCIPLE

A-2.1 Conditioned leathers are marked and measured, subjected to a dry cleaning procedure, followed by an appropriate finishing procedure. They are afterwards conditioned and measured. The dimensional change is expressed as a percentage of the original dimensions.

A-3 REAGENTS

A-3.1 Tetrachloroethylene, Dry Cleaning Grade

A-3.2 Sorbitan Mono-Oleate

A-4 APPARATUS

A-4.1 Dry Cleaning Machine

This shall consist of a commercial rotating cage-type, totally enclosed, machine for use with tetrachloroethylene. The diameter of the rotating cage shall be not less than 600 mm and not more than 1 080 mm. Its depth shall be not less than 300 mm. It shall be fitted with three or four lifters. The speed shall be such as to give a radial acceleration of between 0·5 g_n and 0·8 g_n for cleaning and between 60 g_n and 120 g_n for extraction [*see* Note 1 under **A-9.1** (g)]. The machine shall be equipped with a thermometer for the measurement of solvent temperature. The machine shall have suitable facilities permitting the emulsion to be introduced gradually into the solvent between the cage and the casting, below the level of the solvent, in such a way that it does not fall directly on to the load. The machine shall be equipped with temperature control of either the incoming or the outgoing air during the drying cycle. [For general guidance, *see* Note 2 under **A-9.1** (g)].

A-4.2 Apparatus for Applying Appropriate Finishing Treatment to the Test Specimen

A-4.3 Make-Weights Consisting of Cleaning Textile Pieces or Garments

These shall be white or a light colour and consist of approximately 80 percent wool and 20 percent cotton or viscose.

A-4.4 Means of Marking the Test Specimen

Pen and indelible ink or other suitable marking device can be used.

A-4.5 Stable Measuring Scale of Dimensions, suitable for the article being tested, graduated in millimetres.

A-4.6 A Smooth Flat Surface, of such dimensions that the article being tested can be laid flat for measurement.

A-5 ATMOSPHERES FOR CONDITIONING AND TESTING

A-5.1 For pre-conditioning, an atmosphere of relative humidity not more than 10 percent and of temperature not greater than 50°C.

A-5.2 For conditioning and measuring, the standard atmosphere for leathers, that is relative humidity of 65 ± 2 percent and a temperature of 27 ± 2°C.

A-6 PREPARATION OF TEST PIECES AND MAKE-WEIGHTS

A-6.1 When testing leather pieces, lay out the piece without tension on a flat, smooth surface, taking care to see that it is free from wrinkles and creases. Make three pairs of marks, each at least 250 mm apart, along the length and three similar pairs of marks along the width of the leather.

A-6.2 Condition the test piece and make-weight in the standard atmosphere for testing leather for at least 24 hours.

A-6.3 Lay the test piece out as detailed in **A-6.1** and measure the distance between marks to the nearest millimetre. Make all measurements in the standard atmosphere for conditioning and testing leathers.

A-7 PROCEDURE

A-7.1 The total mass of the complete load shall be 50 ± 2 kg for each cubic metre of the volume of the cage. Ensure that the test piece(s) do not weigh more than 10 percent of the total load, the remainder consisting of make-weights unless the test piece(s) as such weigh(s) more. When loaded into the machine, the piece(s) and the make-weights shall be in equilibrium with the standard atmosphere for testing leathers. Equilibrium is deemed to be attained after exposure for 24 hours.

A-7.2 Place the conditioned load in the machine and introduce tetrachloroethylene containing 1 g/l of sorbitan mono-oleate so that the liquor ratio, calculated on the volume of solvent in the cage and casing is 6·5 ± 0·5 litre for each kilogram of load (this corresponds to a solvent level of approximately 30 percent of the cage diameter). Maintain the solvent at 30 ± 3°C throughout the cleaning operation.

A-7.3 Prepare an emulsion by mixing one part (by volume) of the sorbitant mono-oleate with three parts of tetrachloroethylene and then adding two parts of water (by stirring). Start the machine with the filter circuit shut off, and slowly (over a period of not less than 2 minutes and not more than 12 minutes) add an amount of emulsion, corresponding to 2 percent of water calculated on the mass of the load, to the machine between the inner and outer cages below the level of the solvent.

A-7.4 Keep the machine running for 15 minutes after switching it on. Do not use the filter circuit for the duration of the test.

A-7.5 Drain the solvent and centrifugally extract the solvent from the load for 2 minutes (at least 1 minute at full extraction speed).

A-7.6 Introduce pure dry solvent at the same liquor ratio (*see* **A-7.2**) and rinse for 5 minutes. Drain and extract again for 3 minutes (at least for 2 minutes at full extraction speed).

A-7.7 Dry the load in the machine by tumbling in circulating warm air for an appropriate time, preferably using an automatic solvent dryness control. Either the outlet air temperature shall not exceed 60°C, or the inlet temperature shall not exceed 80°C. After drying, blow air at ambient temperature through the rotating load for 3 to 5 minutes.

A-7.8 Immediately take the test piece(s) from the machine. Place garments individually on hangers and place fabric specimens on a flat surface, for not less than 30 minutes before finishing.

NOTE — If additional information on stability to dry cleaning only is required, condition and re-measure the test piece at this stage before completing the test and include details of this procedure in the report.

A-7.9 Carry out a finishing treatment by the method appropriate for the type of garments or fabric under test [*see* Note 3 under **A-9.1** (g)]. In most cases, this will involve pressing on a garment (steam) press supplied with steam at a pressure of 370 to 490 kPa (over pressure); or on a steam/air garment former for 5 to 20 seconds followed by drying with warm air for 5 to 20 seconds. (1 kPa = 10^{-2} bar, 1 bar = 1 kgf/cm^2).

A-7.10 Condition the test piece as detailed in **A-6.2** and measure to the nearest millimetre each test piece using the procedure referred to in **A-6.3**.

A-8 CALCULATION AND EXPRESSION OF RESULTS

A-8.1 Calculate the average dimensional changes along the length and width of leather test pieces separately or in the principal dimensions of a garment. Express dimensional changes as a percentage rounded to the nearest 0·1 percent, using a minus sign to indicate shrinkage and a plus sign to indicate an increase in dimensions.

A-9 TEST REPORT

A-9.1 Report the following information:

a) Whether the procedure for normal materials or the procedure for sensitive materials was conducted;

b) Results obtained according to **A-8.1**;

c) Number of treatments given;

d) Details of finishing treatment used, stating nil if this is appropriate;

e) Details of dimensions of the garment or fabric specimen;

f) Percentage by mass of test piece(s) in the load, and the type of articles comprising the make-weights; and

g) Maximum inlet or outlet air temperature during drying.

NOTES

1 The radial acceleration is calculated according to the following formula:

$$\frac{5{\cdot}6\, n^2\, d}{1\,000\,000\,0}\, g_n$$

where

n = number or revolutions per minute,

d = diameter of rotating cage in millimetres, and

g_n = standard acceleration of free fall (9·81 m/s²).

2 When using commercial dry cleaning equipment, official regulations and normal safety precautions should be observed.

3 The dimensional changes allowed do not imply that garments in wear will have this tolerance after dry cleaning. Experiments have shown that leathers giving the degree of area changes in the test when processed as garments by normal commercial procedures with reoiling can be restored to their original dimensions.

ANNEX B

[*Table* 1, *Item* (iv) *and Table* 2, *Item* (i)]

COLOUR FASTNESS TO DRY CLEANING

B-1 SCOPE AND FIELD OF APPLICATION

B-1.1 This method is intended for determining the resistance of colour of leather to dry cleaning.

B-1.2 This method is not suitable for evaluation of durability of leather finishes nor is it intended for use in evaluating the resistance of colours to spot and stain removal procedures used by the drycleaner (*see* Notes 1 and 2 under **B-7.5**).

B-2 PRINCIPLE

B-2.1 A specimen of the leather in contact with a cotton fabric bag, along with non-corrodible steel discs, is agitated in tetrachloroethylene also known as perchloroethylene (*see* Notes 2 and 3 under **B-7.5**), then squeezed or centrifuged, and dried in hot air. The change in colour of the specimen is assessed with the grey scale.

B-2.2 At the conclusion of the test, the coloration of the solvent is assessed by comparing the filtered solvent with unused solvent by transmitted light, by means of the grey scale for assessing staining.

B-3 APPARATUS

B-3.1 A suitable mechanical device (*see* Note 4 under **B-7.5**) consisting of a water bath containing a rotable shaft that radially supports, glass or stainless steel containers (75 ± 5 mm diameter and 125 ± 10 mm high) of approximately 550 ± 50 ml capacity, the bottom of the containers being 45 ± 10 mm from the centre of the shaft. The shaft/containers assembly is rotated at a speed of 40 ± 2 rev/min. The temperature of the water bath is thermostatically controlled to maintain the test solvent at 30 ± 2°C.

B-3.2 Glass or Stainless Steel Containers, of approximately 550 ml capacity which shall be closed using solvent resistant gaskets.

B-3.3 Non Corrodible (Stainless) Steel Discs, 30 ± 2 mm by 30 ± 0·5 mm, smooth and free from rough edges, of mass 20 ± 2 g.

B-3.4 Undyed Cotton Twill Cloth, of mass per unit area 270 ± 70 g/m², free from finishes and cut into samples 12 cm × 12 cm.

B-3.5 Grey Scales, for assessing the change in colour in accordance with LF : 1 of IS 6191 : 1971.

B-3.6 Glass Tubes, of diameter 2·5 cm.

B-4 REAGENT

B-4.1 Tetrachloroethylene (also known as perchloroethylene) which must be stored over anhydrous sodium carbonate to neutralize any hydrochloric acid formed.

B-5 TEST PIECE

B-5.1 Cut a strip of the leather approximately 100 mm × 40 mm.

B-6 CONDITIONING OF TEST PIECE

B-6.1 Condition test pieces at 27 ± 2°C and 65 ± 2 percent relative humidity.

B-7 PROCEDURE

B-7.1 Prepare a bag with inside dimensions of 100 mm × 100 mm using the undyed cotton twill cloth by sewing together two squares of this cloth around three sides. Place the test pieces and 12 steel discs inside the bag. Close the bag by any convenient means.

B-7.2 Place the bag containing the test pieces and the steel discs in the container and add 200 ml of tetrachloroethylene at 30 ± 2°C. Treat the test pieces for 30 minutes at 30 ± 2°C in the specified equipment.

B-7.3 Remove the bag from the container, withdraw the test pieces, place them between absorbent paper or cloth and squeeze or centrifuge to remove surplus solvent. Dry the test pieces by hanging them in air at a temperature of 60 ± 5°C.

B-7.4 Assess the change in colour of the test pieces with the grey scale.

B-7.5 At the conclusion of the test, the solvent remaining in the container is filtered through filter paper. The colour of filtered solvent is compared with that of the unused solvent in 25 cm diameter glass tubes that are placed in front of a white card and examined by transmitted light, by means of the grey scale for assessing staining.

NOTES

1 This test covers colour fastness to dry cleaning only; commercial dry cleaning practice normally involves other operation, such as, water spotting, solvent spotting, steam pressing, etc, for which other standard test methods are available if the fully dry cleanability of the leather is to be assessed.

2 The presence of absorbed water in the leather or dry cleaning solution, or the presence of a detergent and water in the dry cleaning solution, has not been found to be a critical factor in assessing the colour fastness. This test gives results which correlate satisfactorily with those obtained in commercial dry cleaning.

3 Fastness to dry cleaning, without further qualification, means fastness to dry cleaning in tetrachloroethylene. However, if required, other solvents may be used and this should be indicated in the test report.

4 Other mechanical devices may be used for the test provided that the results are identical with those obtained by the apparatus described in **B-3.1**.

B-8 REPORT

B-8.1 Report the numerical rating for change in colour of the test pieces and for staining of the solvent.

ANNEX C

[*Table* 1, *Item* (vii)]

COLOUR FASTNESS TO WATER

C-1 SCOPE AND FIELD OF APPLICATION

C-1.1 This method is intended for determining the resistance of colour of the leather to the prolonged action of water.

C-2 PRINCIPLE

C-2.1 A wetted piece of specified undyed textile is placed on the surface of the test piece to be tested. The composite specimen is then left under pressure for a specified time in an appropriate apparatus. The test piece and the textile are dried. The change in colour of the test piece and the staining of the textile are assessed with the grey scales.

C-2.2 Leathers bearing finish may be tested intact or with the finish broken. In the latter case, this shall be stated in the test report.

C-3 APPARATUS AND MATERIALS

C-3.1 Testing Device

In shall consist of a frame of stainless steel into which a weight-piece of mass 5 kg and base 11·5 cm × 6 cm is closely fitted so that a pressure of 12·5 kPa can be applied on test pieces measuring 10 cm × 4 cm placed between glass or acrylic resin plates. If the weight piece is removed during the test, the testing device shall be so constructed that the pressure of 12·5 kPa remains unchanged (*see* Note 1 under **C-5.4.3**).

C-3.2 Oven, maintained at 37 ± 2°C.

C-3.3 Undyed Clothes of Cotton and of Wool, each 10 cm × 4 cm, of plain weave and having a mass per unit area of about 250 g/m² (*see* Note 2 under **C-5-4.3**).

C-3.4 Distilled Water, *p*H 6 to 7.

C-3.5 Fine Grained Abrasive Paper, Grade 180 (*see* Note 3 under **C-5.4.3**).

C-3.6 Grey Scales, for assessing change in colour and staining in accordance with LF : 1 of IS 6191 : 1971.

C-4 TEST PIECES

C-4.1 Two test pieces of leather, each measuring 10 cm × 4 cm, are normally required (*see* Note 2 under **C-5.4.3**). If the grain is to be tested with the finish broken, the breaking of the finish is to be carried out using abrasive paper (*see* Note 3 under **C-5.4.3**).

C-4.2 Wet out the undyed clothes of cotton and of wool by immersing them in boiling water contained in a beaker. Stir occasionally until both clothes are completely wetted out (the wool cloth must have sunk to the bottom of the beaker). Pour off the hot water and refill the beaker with cold distilled water.

C-4.3 Remove the clothes from the water and immediately place smoothly on the surface of the test pieces to be tested. Use a plate of the apparatus as support for each test piece. Gently stroke the clothes to remove any air bubbles trapped between them and the test piece.

C-5 PROCEDURE

C-5.1 Cover the composite test piece which is already resting on one plate, with another plate and then load it in the apparatus with 5 kg, which corresponds to a pressure of 12·5 kPa on the leather surface under test. In order to allow excess water to run off, incline the apparatus about 30° towards the horizontal on each side for a few seconds. When several composite test pieces are being tested simultaneously, take care to ensure that each is placed centrally between two plates in such a way that the pressure is exerted evenly on each.

C-5.2 Place the charged apparatus in the oven at 37 ± 2°C for 3 hours. The loading weight shall be preheated in the oven for at least 1 hour. Where no oven is available, the test may be carried out at room temperature. In such a case, the duration of the test shall be adjusted to give results equivalent to these at 37°C (16 hours at 20°C correspond approximately to 3 hours at 37°C). If the test has been carried out at room temperature, this shall be stated in the report.

C-5.3 At the end of the test, take off the load, remove the composite test piece from the apparatus, stitch it loosely together in one corner and dry under normal conditions (27 ± 2°C and 65 ± 2 percent relative humidity) so that each specimen and its accompanying textile are freely suspended.

C-5.4 When dry, and after treatment as in **C-5.4.1** to **C-5.4.3**, assess the change in colour of the surface of the test piece under test and the staining of the accompanying textile with the appropriate grey scale.

C-5.4.1 *Soft Leathers*

The surface of soft leathers, such as, gloving, may be more or less marked by the texture of the accompanying textile. Manipulate such leather lightly to soften, after drying but before assessment.

C-5.4.2 *Leathers Bearing a Finish*

After drying but before assessment, apply to leathers bearing a finish, intact or broken, a colourless shoe polish (*see* Note 4 under **C-5.4.3**) and polish lightly with a wool cloth.

C-5.4.3 *Suede Leathers*

After drying but before assessment, brush suede leathers in the direction of the nap with a brush that has bristles with a length of the trim of about 3·5 cm.

NOTES

1 Suitable testing devices are the hydrotest, the perspiration tester and the perspirometer. If the dimensions of the composite test pieces differ from the size of 10 cm × 4 cm, a weight-piece shall be used in such a way that a pressure of 12·5 kPa is applied to the test pieces. Other devices may be used provided that the results are identical with those obtained using the apparatus described in **C-3.1**.

2 The undyed clothes used as reference materials are made up of cotton and wool. The results obtained with these materials give a good indication of the general staining characteristics of the wetted leather. In order to satisfy the capacity of even strongly absorbing leather, the wetted clothes must contain a sufficient reserve of water. The recommended qualities of cotton and worsted wool cloth possess a reserve of water of 2·75 ± 0·25 g per piece, 10 cm × 4 cm after squeezing in the hydrotest. If required, the test may also be carried out with clothes made of other fibres, for example, silk, linen, viscose, acetate, nylon and polyester. Several layers of clothes of such fibres are usually needed to provide a sufficient reserve of water. If a multifibre fabric is used, it shall be backed by a woollen cloth to provide a sufficient reserve of water.

3 For breaking of the finish, a piece of leather approximately 11 cm × 5 cm is loaded uniformly on the back with 9·8 N on the area of 10 cm × 4 cm and the surface bearing the finish moved 10 times, 10 cm to and fro on fine grained abrasive paper (Grade 180). The roughened area of the test piece is then cut to 10 cm × 4 cm. With some practice, the finish can also be broken by hand with the same effect using the same abrasive paper. The toughened area should be brushed out thoroughly.

4 A wax emulsion is used as the shoe polish and it is made as follows : 30 g fatty grey carnauba wax, 9 g oleic acid, 6 g morpholine and 25 g water are melted together with stirring and, when blended, boiling water is slowly added with rapid stirring to make up the mixture to 300 g. In some cases, such as, on polyurethane finishes, such a wax emulsion is unsuitable and a polish, consisting of waxes and turpentine substitute only, may have to be used. If shoe polish other than the above wax emulsion is used, this shall be stated in the test report along with the composition of the polish (owing to its toxic nature, morpholine should be handled with care at all times).

C-6 REPORT

C-6.1 State the type of leather under test.

C-6.2 Specify which surface of the specimen was tested.

C-6.3 For leather bearing a finish, state whether the finish was broken.

C-6.4 Where the test was not carried out at 37°C, state the temperature and duration of test.

C-6.5 For every composite test piece, state the nature of the accompanying textile and report the numerical ratings for the change in the colour of the leather and for the staining of the accompanying textile.

ANNEX D

[*Table* 2, *Item* (ii)]

METHOD FOR MEASUREMENT OF ADHESION OF FINISH TO LEATHER

D-1 PRINCIPLE

D-1.1 One end of a piece of leather under test is stuck finish side down, to a metal strip, by a selected adhesive, chosen to give an adequate bond between the finish and the metal without affecting the adhesion of finish to the leather. When the adhesive is fully set or cured, increasing force is applied to the loose end of the leather until the finish peels away from the leather. The load required to peel the finish is recorded.

D-2 APPARATUS AND REAGENTS

D-2.1 Metal Plates

The plate shall be measuring 10 ± 0·5 mm wide and approximately 75 mm long and 3-3·5 mm thick. One plate is required for each pair of leather test pieces.

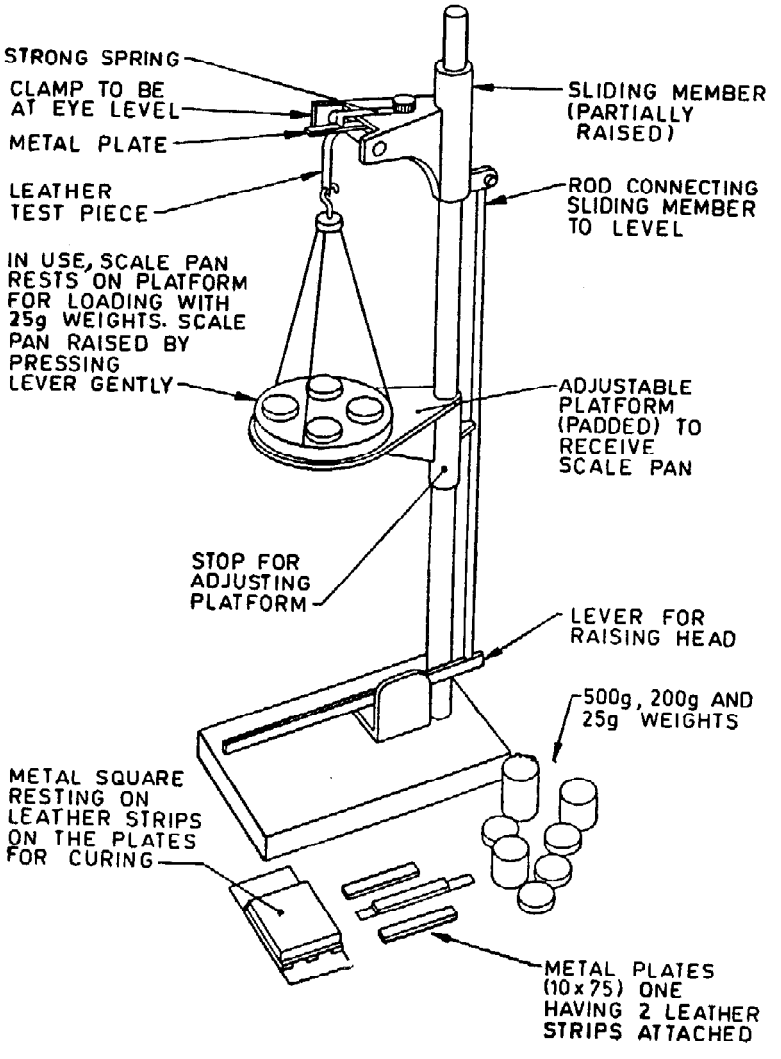
D-2.2 Metal square with sides 65 mm long and a mass of 150 g, covered on one side with a soft rubber sheet 2 mm thick.

D-2.3 Clamp and Stand

These are required to hold the metal strip and test specimens and strong enough to support loads of up to 2 kg.

D-2.4 Means of Applying Small Successive Additions of Load

The addition of load shall be without shock, to a holder attached to the loose end of the leather. For example, weights of 25 or 50 g can be placed on a simple scale pan of known mass (preferably 50 g) attached to the leather by means of a hook. A suitable apparatus of this type is shown in Fig. 1.



All dimensions in millimetres.

FIG. 1 LEATHER FINISH ADHESION TESTER

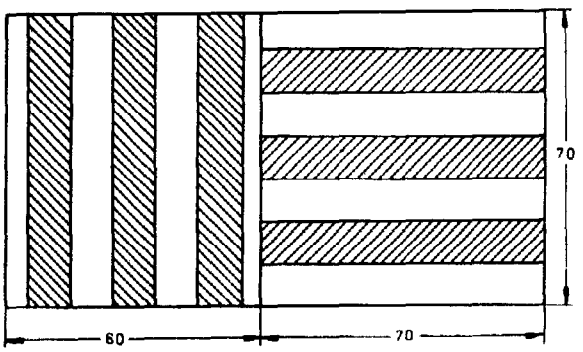
D-2.5 Adhesive

Different adhesives give different results on the same leather. For most leather finishes, an epoxy resin adhesive with a pot life of about 1 hour at 20°C, mixed with an equal part by mass of a curing agent and having a cure time of 48 hours has been found suitable.

D-2.6 Pure Light Petroleum Ether, boiling point range of 60 to 80°C.

D-3 TEST PIECES

D-3.1 Cut a sample of leather measuring 130 mm in length and 70 mm in width from the official sampling position. Cut one piece for dry tests and another piece for wet tests. Fig. 2 shows the sample of leather taken for testing and the shaded areas show the actual area of test pieces required.



All dimensions in millimetres.

FIG. 2 POSITION OF TEST PIECES ON LEATHER SAMPLE

D-4 PREPARATION OF TEST PIECES

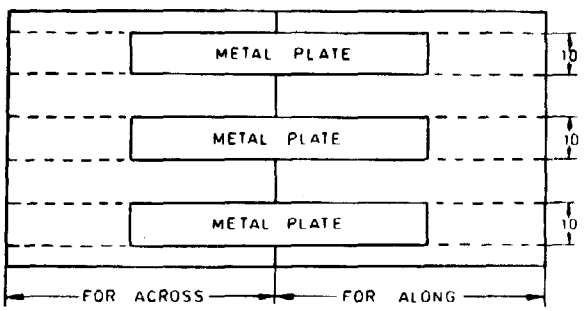
D-4.1 Scour the metal plates with 'A' weight grade P 400 abrasive so that the surface is clean and flat with a fine matt finish. Immerse them in petroleum ether for a few seconds to remove grease and wipe with a piece of grease-free cotton wool (medical quality) to remove all the dirt.

D-4.2 Cut the leather into two pieces for three test pieces 'along' and three 'across' (*see* Fig. 2). Turn the 'across' sample through a right angle and place it against the 'along' sample. Soak a piece of grease-free cotton wool (medical quality) in petroleum ether and then wring it almost dry. Wipe this gently over the grain surface of leather test specimens and the surfaces of the metal plates being careful not to contaminate the cleaned surfaces, for example, with grease from the fingers.

D-4.3 When the petroleum ether has evaporated, smear the adhesive lightly over the cleaned surface of the metal plates and the area of leather to be tested, applying the thinnest possible continuous film of adhesive.

NOTE — A glass or nylon scraper is a suitable tool.

D-4.4 Place three metal plates, adhesive side down, on to the two pieces of leather as shown in Fig. 3. Press the plates firmly down and ensure that sufficient adhesive has been used by noting slight exudation at the edges of the plates. It is important that there should be not more than 3 minutes between coating of the metal strip with adhesive and combination with the leather to prevent exposure to moisture and dust.



All dimensions in millimetres.

FIG. 3 ARRANGEMENT OF METAL PLATES ON TEST PIECES

D-4.5 Place the metal square on the metal plates (*see* Fig. 4). Place a weight having a mass of approximately 1 350 g centrally on the metal square so that the total load of approximately 1 500 g (500 g per plate) is applied evenly to all the adhesive bonds.

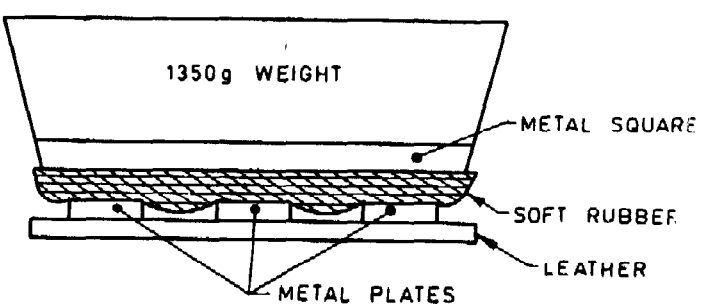


FIG. 4 BONDING OF METAL PLATES TO LEATHER TEST PIECES

NOTE — D-4.2, D-4.4 and D-4.5 describe the use of one piece of leather to provide six test pieces. If separate test pieces are used, these should be at least 50 mm long and 13 mm wide but the method is essentially the same.

D-4.6 When the joints are fully set or cured, remove the weight and the metal square, trim the leather test specimens to the width of the metal plate by cutting along the edges of the plate with a pair of sharp scissors or a scalpel. To avoid edge effects, make sure that no adhesive is left on the edges of the metal plate. Gently sever the bond between the short edge of the metal plate and each test piece, that is at '*A*' in Fig. 5, separating leather and the metal for about 1·5 mm.

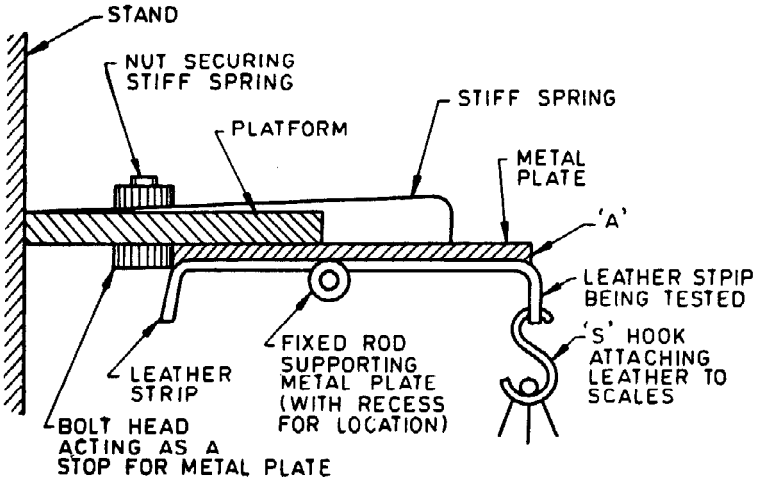


FIG. 5 PREPARED TEST PIECES IN TEST POSITION

D-4.7 Punch a small hole of sufficient diameter to accommodate an *S*-hook in the free end of the test pieces and about 5 mm from the end.

D-5 PROCEDURE

D-5.1 Adhesion of Finish Under Dry Conditions

D-5.1.1 Place the metal plate horizontally in the stand over the supporting rod so that the affixed leather is on the underside (*see* Fig. 5). Insert an *S*-hook in the hole at the end of the leather strip to be tested and attach the scale pan of known mass to the hook. Depress the lever at the base of the stand slowly to allow the mass of the pan to pull on the leather strip. This represents the first test equal to 50 g (mass of the pan assembly).

D-5.1.2 Release the lever slowly until the pan rests on its plateform. Carefully, add successive additional weights centrally to prevent swinging, freeing the pan for each addition by means of the lever until the leather shows signs of beginning to peel away from the metal plate. Up to this stage, the weights may be added as quickly as is convenient. Continue adding weights at 10 s intervals until separation has occurred over at least two-thirds of the area of the bond. Use 250 g increments until the total load reaches 400 g and thereafter use 50 g increments.

D-5.1.3 When separation has occurred, add together the total mass of the weights on the pan and the mass of the scale pan. Calculate from this, the force (in N/10 mm) and express the result as the adhesion of the finish.

D-5.1.4 Note the type of separation which occurred and describe it as one of the following:

a) Normal peeling, that is, for a length not less than 10 mm and covering 90 percent of the width of the test specimen;

b) Plate to adhesive failure;

c) Adhesive to finish failure;

d) Finish coats separating;

e) Adhesion of finish failing in patches; or

f) Leather torn (grain coming away or tearing into corium).

If adhesion failure (b) or (c), indicating an unsatisfactory adhesive or poor preparation of test specimens occurs, repeat the entire procedure using a different adhesive or a new sample of leather.

D-5.2 Adhesion of Finish Under Wet Conditions

D-5.2.1 After preparation and trimming (*see* **D-4**), immerse the metal plates and attached leather strips in distilled water for 20 minutes rubbing the flash side with the finger to facilitate penetration. Remove the plate and blot off excess moisture from the metal and the leather. Allow to stand in air for 10 minutes in the laboratory.

D-5.2.2 Proceed as in **D-5.1.1** to **D-5.1.4**.

D-6 TEST REPORT

D-6.1 The test report shall state either :

a) the adhesion of the finish on the individual test pieces with the type of failure (*see* **D-5.1.4**), or

b) the average adhesion in each direction (and for each location) together with the lowest individual value and the type of failure.

ANNEX E

[*Table* 2, *Item* (iii)]

METHOD FOR DETERMINATION OF COLD CRACK TEMPERATURE

E-1 PRINCIPLE

E-1.1 A strip of leather is held between two pieces of wood forming a hinged apparatus. The leather is cooled and then creased, grain outwards.

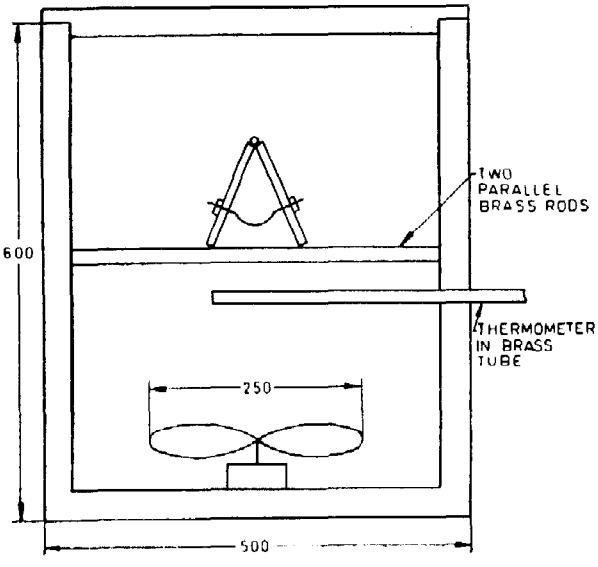
E-2 APPARATUS

E-2.1 Refrigerated Cabinet (*see* **Fig. 6**)

The dimensions of the cabinet are not critical but the dimensions 500 mm × 300 mm × 600 mm have been found suitable. It is essential that the cabinet has forced air circulation.

NOTE — In Fig. 6, this is provided by a fan set at the bottom of the cabinet. Cooling can be provided either by solid carbon dioxide placed in triangular trays in the corners of the cabinet or by an independent cooling unit so that the air is forced in near the base of the cabinet and exhausted near the top. Temperature is controlled in the first case by intermittent manual switching of fan to maintain the required temperature. In the latter case, a thermostat can be incorporated in the effluent air stream and set to the required temperature.

If a deep freeze cabinet is used, it is again essential to incorporate a fan for air movement over the test pieces and a thermostat to maintain the required temperature.



All dimensions in millimetres.

FIG. 6 REFRIGERATED CABINET

E-2.2 Hinged Apparatus for Mounting the Test Pieces (*see* Fig. 7)

It shall be provided with holes of 5 mm diameter set 40 mm in from the free edge. These are countersunk on the inside so that the fixing screws for the samples fit flush with the surface and the apparatus can be closed flat. The position of the samples in the open position is shown in Fig. 8 and that in the closed position in Fig. 9. This enables the cracks (if any) to be examined. The hinged apparatus is placed on two parallel brass rods 125 mm apart as shown in Fig. 6. Between the brass rods, at the same level, a thermometer is placed in a brass tube for safety. This can be read externally.

E-3 TEST PIECES

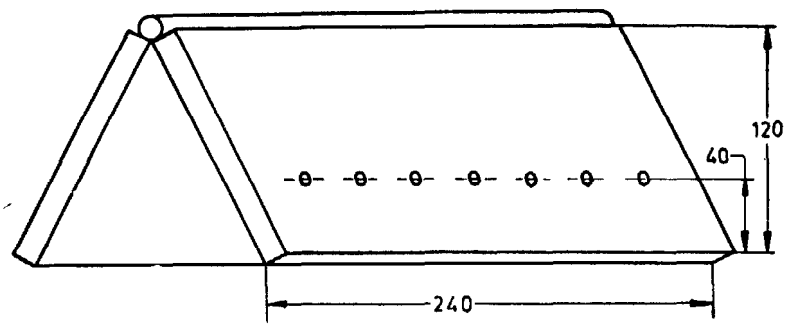
E-3.1 Test pieces of leather which measure 90 mm × 12·5 mm with a 5 mm hole punched 5 mm from each end of the sample are taken for testing.

E-4 PROCEDURE

E-4.1 Cut eight test pieces of the leather, one to be tested at each temperature from + 5°C to — 30°C at 5°C intervals.

E-4.2 Fix the test piece in the hinged apparatus. If more than one leather is to be tested at the same time in the hinged apparatus, ensure that all leathers are of approximately the same thickess. Thicker test pieces will prevent the thinner one from being folded flat.

E-4.3 With the hinged apparatus in the open position, place it on the brass rods with the open part facing downwards (*see* Fig. 8). Close the refrigerated cabinet and run until the temperature is +5°C. Maintain this temperature for 5 minutes. This is the minimum time with air movement which is required for the sample to reach equilibrium in a refrigerated cabinet. Then open the cabinet and snap shut the hinged apparatus by hand inside the cabinet. Remove the apparatus from the cabinet and examine the test piece for cracks. If the test piece has not cracked, replace it by a further test piece and replace the apparatus in the cabinet. Lower the temperature to 0°C and maintain for 5 minutes before snapping shut once more. Repeat the test at —5, —10,



All dimensions in millimetres.

FIG. 7 HINGED APPARATUS

−15, −20, −25 and −30°C or until the finish shows cracks. The lowest temperature that can be conveniently reached is − 30°C.

E-5 EXPRESSION OF RESULTS

E-5.1 Record the highest temperature at which the finish cracks and report it as the cold crack temperature.

NOTE — Some finishes do not show straight line cracks. Some show small fine crack, and their examination with a magnifying glass may be desirable. If a test piece has very fine cracks initially, the end point may not be clear or may be missed.

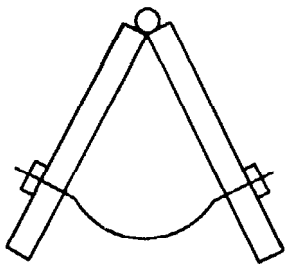


FIG. 8 HINGED APPARATUS (OPEN POSITION)

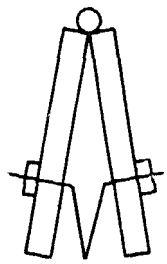


FIG. 9 HINGED APPARATUS (CLOSED POSITION)

ANNEX F

(*Clause* 4.2)

METHOD OF TEST FOR WATER REPELLENCY

F-1 PRINCIPLE

F-1.1 Few drops of distilled water are sprinkled on the leather test piece laid flat on a smooth and flat surface and allowed to rest for 10 minutes. The test piece is then checked for any stain or spot.

F-2 PROCEDURE

F-2.1 Lay the leather test piece on a smooth and flat surface with grain side up. Sprinkle a few drops of distilled water on the surface of leather and allow the water drop to rest for 10 minutes. Take out the leather and remove the water drops by shaking the test piece. Lay the leather test piece again on the flat surface and observe for any stains or spots left over by distilled water drops.

The leather shall be considered to have passed the requirement for water repellency if no strains or spots are observed on the test piece surface.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference :

Doc : No. CDC 16 (9209)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43 3 16 41
Southern : C.I.T. Campus, 4 Cross Road. MADRAS 600113	41 24 42 41 25 19 41 29 16
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	6 32 92 95

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESWAR. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. PATNA. TRIVANDRUM.

Printed at Swatantra Bharat Press, Delhi, India